Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile and Satellite Frequency Bands	ET Docket No. 03-237

COMMENTS OF SIRIUS SATELLITE RADIO INC.

Sirius Satellite Radio Inc. ("Sirius") comments on the Commission's Notice of Inquiry and Notice of Proposed Rulemaking ("*NOI and NPRM*") in the above-captioned proceedings.[1] The *NOI and NPRM* proposes, *inter alia*, a new interference management paradigm based on the adaptive or real-time measurement of interference temperature[2] and a process to restrict the operation of "devices" to maintain the interference temperature below a predetermined limit.[3]

Sirius is one of two companies licensed by the Commission to operate and offer satellite digital audio radio service ("satellite DARS"). The satellite DARS licensees combined spent over

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1 *Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile and Satellite Frequency Bands*, Notice of Inquiry and Notice of Proposed Rulemaking, FCC 03-289, 18 FCC Rcd 25309 (2003) ("*NOI and NPRM*"); *see also Interference Temperature Operation*, 69 Fed. Reg. 2863 (Jan. 21, 2004) (proposed rule) and *Interference Temperature Operation*, 69 Fed. Reg. 5945 (Feb. 9, 2004) (proposed rule and ministerial correction).

2 Interference Temperature is a measure of the RF power generated by undesired emitters plus noise sources that are present in a receiver system (I+N) per unit of bandwidth. *NOI and NPRM*, 18 FCC Rcd at 25313 (¶ 10).

3 *NOI and NPRM*, 18 FCC Rcd at 25313-14 (¶¶ 10-11).

$ 3 billion to construct, launch and operate satellite constellations now in service. The two companies already serve more than 1.5 million subscribers, with high customer growth rates. Sirius provides continuous digital radio with over 100 audio channels, substantially augmenting the diversity and choice available to American consumers. As a result, satellite DARS licensees have dramatically reduced the disparity in access to radio to 45 million underserved consumers in the U.S., particularly those in rural areas with more limited terrestrial coverage.[4] These important and highly demanded services—as well as the business of satellite DARS licensees—could be undermined absent continued protection from out-of-band emissions from adjacent services and in-band emissions from any hypothetical unlicensed devices. More precisely, excessive energy interference in the satellite DARS band could hinder the ability of the satellite DARS licensees to deliver service and thus jeopardize the rapid deployment envisioned by the Commission. Moreover, the agency's rationale, and tentative public interest findings, supporting interference temperature do not and could not apply to satellite DARS.

First, the proposed interference temperature metric is unnecessary because Sirius is the sole authorized user of the 2320-2332.5 MHz band.[5] The instant rulemaking proposes using interference temperature where spectrum is licensed to multiple users or in bands where low power devices (so-called "Part-15") can operate under the frequencies on an unlicensed basis. The agency asserts, "the interference temperature limit approach could be beneficial to licensees" and

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[4] *Satellite CD Radio, Inc., Application for Authority to Construct, Launch, and Operate Two Satellites in the Satellite Digital Audio Radio Service*, Order and Authorization, 13 FCC Rcd 7971, 7971-72 (1997) ("*Sirius Order and Authorization*"), *affirmed*, 16 FCC Rcd 21458 (2001).

[5] Sirius is the exclusive licensee in its assigned frequency band, 47 C.F.R. § 25.202(a)(6) (2003) (stating the 2320-2345 MHz band is allocated exclusively for satellite DARS), and the satellite DARS spectrum is a restricted band under Part 15, barring any unlicensed devices in the 2320 – 2345 MHz band. 47 C.F.R. § 15.205(a) (2003) (prohibiting Part 15 devices from operating within the 2310-2390 MHz band). The *NPRM and NOI* does not purport to change the Part 15 restricted bands; such an action would be beyond the scope of the notice in this proceeding.

"would fix the amount of new interference that the station could experience."[6] In the satellite DARS band, however, other authorized licensed or unlicensed emitters are not present. Indeed, Sirius holds an exclusive satellite DARS license in the 2320.0-2332.5 MHz band, which it acquired through a winning bid of more than $83 million at auction in 1997.[7] Accordingly, "new interference" is not contemplated in the satellite DARS band.[8] Thus, because no other co-frequency emitters will be permitted to enter this band, the proposed interference temperature measurement techniques are both useless and unnecessarily complex. Accordingly, Sirius suggests that the new technique, if adopted, not be applied to the 2320-2345 MHz bands.

Second, it does not make sense to use a noise floor metric to manage interference in the satellite DARS band. The FCC proposed an interference temperature metric in order to quantify when "a modest rise in the noise floor, such as envisioned by the interference concept, would generally not cause harmful interference as defined under our rules."[9] However, no increase in the noise floor is contemplated due to Sirius' exclusive right to transmit in the band. It therefore makes no sense to apply a metric predicated on an increase in the noise floor in a band where Sirius is the only party, licensed or unlicensed, that may transmit.

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6 *NOI and NPRM*, 18 FCC Rcd at 25314 (¶¶ 15 and Figure 1).

7 47 C.F.R. § 25.202(a)(6) (2003) (stating the 2320-2345 MHz band is allocated exclusively for satellite DARS).

8 *FCC Announces Auction Winners for Digital Audio Radio Service*, 12 FCC Rcd 18727, 18727 (1997) (Public Notice) (noting that the satellite DARS licensees Satellite CD Radio, Inc. and American Mobile Radio Corporation paid $83,346,000.00 and $89,888,888.00, respectively); *Sirius Order and Authorization, modified by Sirius Satellite Radio Inc. for Minor Modification of License to Construct, Launch, and Operate a Non-Geostationary Satellite Digital Audio Radio Service System*, 16 FCC Rcd 5419 (2001) (Order and Authorization) ("*Modification Order*").

9 *NOI and NPRM*, 18 FCC Rcd at 25320 (¶ 27). At no point does the *NOI and NPRM* specify what constitutes a "modest" increase in the noise floor. Moreover, any action to implement the interference noise metric is premature as the NOI and NPRM highlights at ¶¶ 24-26, but fails to solve, the difficult problem of determining the actual noise floor on which the interference noise temperature is to be based.

Moreover, a noise interference metric would offer insufficient protection in the satellite DARS band in any event. Satellite DARS consumer receivers are particularly susceptible to interference from the in-band energy of unlicensed transmitters addressed in the *NOI and NPRM*. Thus, the proposed metric is not suitable for use with Sirius' satellite radio downlinks, which are continuous transmissions that cover the whole continental United States. Satellite radio receivers employ very small aperture, near omni-directional antennas and receivers that operate near the noise floor. Satellite DARS user receivers are designed with sufficient link margin to overcome outages from small or brief blockage, multi-path fading, and foliage attenuation. However, providing uninterrupted high quality audio in a mobile environment typically leaves little excess margin to overcome out-of-band interference from adjacent services[10] or in-band interference from unlicensed devices that might be contemplated by the *NOI and NPRM*. Even a "modest" increase in the noise floor could exceed the interference rejection in satellite DARS user receivers, causing signal dropouts.

Third, existing standards for managing interference in the satellite DARS band are successful and the Commission should not alter course for an untested and inappropriate metric. Satellite DARS services require a low noise floor because, were satellite DARS "subject to excessive interference, the service will not be successful and the American public will not benefit from the service."[11] As a result, the FCC required WCS licensees in the adjacent spectrum to meet stringent out-of-band suppression requirements necessary to protect satellite DARS.[12] For example, the Commission required adjacent mobile WCS transmitters to attenuate emissions in the

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10 *Joint Petition For Partial Reconsideration of Sirius Satellite Radio, Inc. and XM Radio, Inc.*, ET Docket No. 98-153, at 2 (filed June 17, 2002) ("Joint Petition").

11 *Agreement of the Commission's Rules to Establish Part 27, the Wireless Communications Services,* Memorandum Opinion and Order, 12 FCC Rcd 3977, 3991-92 (1997) ("*WCS Order*").

12 *Id.*

satellite DARS band to 110 + 10 log (p) dB below transmitter power.[13] The Commission also required adjacent fixed WCS transmitters to attenuate emissions in the satellite DARS band to 80 + 10 log (p) dB below transmitter power.[14] These limits are already codified as Commission rules.[15] In the *NPRM*, the Commission recognizes "the need to assure that increased operation of unlicensed devices enabled under the interference temperature concept in these bands will not result in harmful out-of band interference."[16] To the extent that the *NOI and NPRM* contemplate permitting unlicensed intentional radiators to operate in spectrum adjacent to the satellite DARS band, the out-of band energy from such devices that is permitted in the satellite DARS band should not be allowed to exceed the out-of-band energy from licensed devices in adjacent bands that is permitted to fall within the satellite DARS band.[17] There is no rational basis for providing lesser protection against unlicensed devices than licensed devices operating in the same frequency band. Indeed, in some cases, the Commission has found that greater protection is appropriate.[18]

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13 *See* 47 C.F.R. § 27.53(a)(2) (2003). In addition, WCS rules limit mobile transmitters to 4 watts E.I.R.P. peak power. *See* 47 C.F.R. § 27.50(f)(2) (2003).

14 *See* 47 C.F.R. § 27.53(a)(1) (2003).

15 47 U.S.C. § 303(f) (authorizing the Commission to make regulations "necessary to prevent interference between stations").

16 *NOI and NPRM*, 18 FCC Rcd at 25238 (¶ 49).

17 Because the restricted band encompassing Sirius' exclusive license spans from 2310 MHz to 2390 MHz, the closest adjacent spectrum in which unlicensed devices potentially could be accommodated consistent with Part 15 is 2305-2310 MHz which is licensed to WCS.

18 Notably, the Commission's rules for out-of-band emissions from portable ultra-wideband devices of the kind that may be used outdoors, 47 C.F.R. § 15.519(c) (2003), require attenuation to a level of –61.3 dBm, which is approximately 21.3 dB more attenuation than the maximum level of out-of-band emissions from WCS devices. In other cases, such ultra-wideband emissions are required to be attenuated to a level of no more than –51.3 dBm. *See, e.g.*, 47 C.F.R. § 15.517 (2003).

New interference temperature techniques would either be irrelevant to, or inconsistent with, the existing, and successful, interference and sharing scenarios.[19]

In short, the proposed but untested rule effectively could require licensees to give up a portion of their operating margin and could preclude the high quality audio long sought by the FCC and now widely demanded by consumers. This would work a huge change in the rights granted by Sirius' "exclusive" license. The Commission concedes in the *NOI and NPRM* that "an approach that uses real-time adaptation based on actual RF environments has not been done in the past and therefore represents a fundamental shift in spectrum management."[20] The FCC neither justifies so drastic a shift from prior policies[21] nor supplies any basis for changing the restricted bands of Part 15 of the Commission's rules.[22]

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19 The NPRM does not purport to change Parts 15 or 27 in ways that might make interference temperature measurement relevant, thus necessitating additional Notice and Comment prior to any such rule changes.

20 *NOI and NPRM*, 18 FCC Rcd at 25238 (¶ 19).

21 *Cf. Melody Music, Inc. v. FCC*, 345 F.2d 730, 732-33 (D.C. Cir. 1965).

22 *Cf. Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 852 (D.C. Cir. 1970), *cert. denied*, 403 U.S. 923 (1971).

To protect satellite DARS from harmful interference, Sirius requests that the Commission omit the satellite DARS band from any application of the proposed interference temperature metric. The growing audience of enthusiastic satellite DARS listeners deserves no less.

Respectfully submitted,

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